THE CLAIMS

This Listing of Claims replaces all prior versions, and listings, of claims in this application.

1.   (Previously Presented) A method comprising:

accessing header information from a multi-resolution codestream of compressed data of a first image;

deriving one or more retrieval attributes from the header information; and

performing image analysis between the first image and a second image based on the one or more retrieval attributes.

2.   (Original) The method defined in Claim 1 wherein the header information comprises the number of bits per codeblock.

3.   (Original) The method defined in Claim 1 wherein the multi-resolution codestream complies with the JPEG 2000 Standard.

4.   (Original) The method defined in Claim 1 wherein the image analysis comprises similarity matching.

5.   (Original) The method defined in Claim 1 wherein the image analysis comprises clustering.

6.   (Original) The method defined in Claim 1 wherein the image analysis comprises categorization.

7.   (Previously Presented) The method defined in Claim 1 wherein deriving the one or more retrieval attributes comprises creating a first vector of the one or more retrieval attributes, and performing image analysis comprises comparing the first vector with a second vector of one or more retrieval attributes associated with a second image.

8.   (Original) The method defined in Claim 1 further comprising performing retrieval of the second image based on a result of image analysis.

9.   (Original) The method defined in Claim 1 wherein the one or more retrieval attributes comprise one or more resolution-sensitive features.

10.   (Previously Presented) The method defined in Claim 1 wherein the one or more retrieval attributes comprise one or more selected from a group consisting of one or more content percentages relating to an amount of one or, more of text, image, color and background in the first document image, one or more statistics of connected components in at least one resolution-level segmentation map, spatial relationships between components in one or both of the at least one resolution-level segmentation map and one or more bit distribution images, one or more histograms for code block partition, one or more resolution-level histograms, column layout, and one or more of projection histograms of text blocks, background blocks, color blocks, and resolution values in the at least one resolution-level segmentation map.

11.   (Original) The method defined in Claim 1 wherein the first image comprises a scanned compound document.

12.   (Original) The method defined in Claim 1 wherein deriving the one or more retrieval attributes comprises computing the one or more retrieval attributes.

13.   (Previously Presented) The method defined in Claim 1 wherein the codestream includes a plurality of layers of coded data and where accessing the header information comprises accessing header data connected with one of the layers.

14.   (Original) The method defined in Claim 13 wherein the plurality of layers comprises a luminescence layer, a chrominance layer, and a layer for the remaining bits.

15.   (Previously Presented) A computer readable media having one or more-recordable media storing instructions thereon which, when executed by a system, cause the system to perform a method comprising:

accessing header data from a multi-resolution codestream of compressed data of a first image;

deriving one or more retrieval attributes from the header information; and

performing image analysis between the first image and a second image based on the one or more retrieval attributes.

16.   (Previously Presented) The computer readable media defined in Claim 15 wherein the header information comprises the number of bits per codeblock.

17.   (Previously Presented) The computer readable media defined in Claim 15 wherein the multi-resolution codestream complies with the JPEG 2000 Standard.

18.   (Previously Presented) The computer readable media defined in Claim 15 wherein the image analysis comprises similarity matching.

19.   (Previously Presented) The computer readable media defined in Claim 15 wherein deriving one or more retrieval attributes comprises creating a first vector of the one or more retrieval attributes, and performing image analysis comprises comparing the first vector with a second vector of one or more retrieval attributes associated with a second image.

20.   (Previously Presented) The computer readable media defined in Claim 15 wherein the method further comprises performing retrieval of the second image based on a result of image analysis.

21.   (Previously Presented) The computer readable media defined in Claim 15 wherein the one or more retrieval attributes comprise one or more resolution-sensitive features.

22.   (Previously Presented) The computer readable media defined in Claim 15 wherein the one or more attributes comprise one or more selected from a group consisting of one or more content percentages relating to an amount of one or more of text, image, color and background in the first document image, one or more statistics of connected-components in the at least one resolution-level segmentation map, spatial relationships between components in one or both of the at least one resolution-level segmentation map and one or more bit distribution images, one or more histograms for code block partition, one or more resolution-level histograms, column layout, and one or more of projection histograms of text blocks, background blocks, color blocks, and resolution values in the at least one resolution-level segmentation map.

23.   (Previously Presented) The computer readable media defined in Claim 15 wherein the first image comprises a scanned compound document.

24.   (Previously Presented) The computer readable media defined in Claim 15 wherein deriving the one or more retrieval attributes comprises computing the one or more retrieval attributes.

25.   (Previously Presented)   The computer readable media defined in Claim 15 wherein the codestream includes a plurality of layers of coded data and where accessing the header data comprises accessing header data connected with one of the layers.

26.   (Previously Presented) The computer readable media defined in Claim 25 wherein the plurality of-layers comprises a luminescence layer, a chrominance layer, and a layer for the remaining bits.

27.   (Original) An apparatus comprising:
        means for accessing header data from a multi-resolution, codestream of compressed data of a first image;

means for deriving one or more retrieval attributes from the header information; and

means for performing image analysis between the first image and a second image based on the one or more retrieval attributes.

28. (Withdrawn) A method comprising:

extracting at least one multi-resolution bit distribution from a header in a multi-resolution codestream of compressed data of a first image;

generating one or more attributes of the first image using the at least one multi-resolution bit distribution; and

performing similarity matching between the first image and one or more other images using the one or more attributes.

29. (Withdrawn) The method defined in Claim 28 wherein each of the at least one multi-resolution bit distribution corresponds to one image component.

30. (Withdrawn) The method defined in Claim 29 wherein the one image component comprises one selected from the group consisting of a luminance plane, a chrominance plane, and a color plane.

31. (Withdrawn) The method defined in Claim 28 wherein the at least one multi-resolution bit distribution provides information of the first document image at codeblock resolution.

32. (Withdrawn) The method defined in Claim 31 wherein the at least one multi-resolution bit distribution is, indicative of information on a 'visual document layout of the first document image.

33. (Withdrawn) The method defined in Claim 28 wherein generating the one or more attributes of the first document image comprises deriving the one or more attributes by applying an algorithm to the at least one multi-resolution bit distribution.

34.   (Withdrawn) The method defined in Claim 28 wherein generating the one or more attributes comprises generating at least one resolution-level segmentation map from one of the at least one multi-resolution bit distribution.

35.   (Withdrawn) The method defined in Claim 34 wherein generating at least one resolution-level segmentation map comprises generating one resolution-level segmentation map for planes of one selected from a group consisting of color planes and a group of luminance and chrominance planes.

36.   (Withdrawn) The method defined in Claim 34 wherein the one or more attributes comprise one or more selected from a group consisting of one or more content percentages relating to an amount of one or more of text, image, color and background in the first document image, one or more statistics of connected components in the at least one segmentation map, spatial relationships between components in one or both of the at least one segmentation map and one or more bit-distribution images, one or more histograms for code block partition, one or more resolution-level histograms, column layout, and one or more of projection histograms of text blocks, background blocks, color blocks, and resolution values in the at least one resolution-level segmentation map.

37.   (Withdrawn) The method defined in Claim 34 further comprising:
          computing high-resolution information from the at least one resolution-level segmentation map;
          classify the information into text data and non-text data classes; and
          applying a projection method to the information classified as text data to determine a number of columns.

38.   (Withdrawn) The method defined in Claim 37 wherein computing the high-resolution information from the at least one resolution-level segmentation map comprises masking the at least one multi-resolution bit distribution at a first resolution level with the resolution-level segmentation map at a second resolution level.

39.   (Withdrawn) An article of manufacture having one or more recordable media storing instructions thereon which, when executed by a system, cause the system to perform a method comprising:

extracting at least one multi-resolution bit distribution from a header in, a multi-resolution codestream of compressed data of a first document image;

generating one or more attributes of the first document image using the at least one multi-resolution bit distribution; and

performing similarity matching between the first document image and one or more other document images using the one or more attributes.

40.   (Withdrawn) The article of manufacture defined in Claim 39 wherein each of the at least one multi-resolution bit distribution corresponds to one image component.

41.   (Withdrawn) The article of manufacture defined in Claim 40 wherein the one image component comprises a luminance plane, a chrominance plane, and a color plane.

42.   (Withdrawn) The article of manufacture defined in Claim 39 wherein the at least one multi-resolution bit distribution provides information of the first document image at codeblock resolution.

43.   (Withdrawn) The article of manufacture defined in Claim 42 wherein the at least one multi-resolution bit distribution is indicative of information on a visual document layout of the first document image.

44.   (Withdrawn) The article of manufacture defined in Claim 39 wherein generating the one or more attributes of the first document image comprises deriving the one or more attributes by applying an algorithm to the at least one multi-resolution bit distribution.

45.   (Withdrawn) The article of manufacture defined in Claim 39 wherein generating the one or more attributes comprises generating at least one resolution-level segmentation map from one of the at least one multi-resolution-bit distribution.

46.   (Withdrawn) The article of manufacture defined in Claim 45 wherein generating at least one resolution-level segmentation map comprises generating one resolution-level segmentation map for planes of one selected from a group consisting of color planes and a group of luminance and chrominance planes.

47.   (Withdrawn) The article of manufacture defined in Claim 45 wherein the one or more attributes comprise one or more selected from a group consisting of one or more content percentages relating to an amount of one or more of text, image, color and background in the first document image, one or more statistics of connected components in the at least one segmentation map, spatial relationships between components in one or both of the at least one segmentation map and one or more bit distribution images, one or more histograms for code block partition, one or more resolution-level histograms, column layout, and one or more of projection histograms of text blocks, background blocks, color blocks, and resolution values in the at least one resolution-level segmentation map.

48.   (Withdrawn) The article of manufacture defined in Claim 45 further comprising:
        computing high-resolution information from the at least one resolution-level segmentation map;
        classify the information into text data and non-text data classes; and
        applying a projection method to the information classified as text data to determine a number of columns.

49.   (Withdrawn) The article of manufacture defined in Claim 48 wherein computing the high-resolution information from the at least one resolution-level segmentation map comprises masking the at least one multi-resolution bit distribution

at a first resolution level with the resolution-level segmentation map at a second resolution level.

50.   (Withdrawn) An apparatus comprising:

means for extracting at least one multi-resolution bit distribution from a header in a multi-resolution codestream of compressed data of a first document image;

means for generating one or more attributes of the first document image using the at least one multi-resolution bit distribution; and

means for performing similarity matching between the first document image and one or more other document images using the one or more attributes.

51.   (Withdrawn) An apparatus comprising:

an input port to receive a first document image;

a retrieved attributes calculation unit coupled to the input port to generate one or more attributes of the first document image using at least one multi-resolution bit distribution extracted from a header in a multi-resolution codestream of compressed data of the first document image; and

a document management system to perform similarity matching between the first document image and one or more other document images of one or more retrieved documents using the one or more attributes and to determine if at least one retrieved document meets, a similarity threshold.

52.   (Withdrawn) The apparatus defined in Claim 51 further comprising an output port coupled to output the at least one retrieved document, if any.

53.   (Withdrawn) The apparatus defined in Claim 52 further comprising a printer coupled to the output port to print the at least one retrieved document.

54.   (Withdrawn) The apparatus defined in Claim 51 further comprising a scanner coupled to the input port to create the first document image.

55.   (Withdrawn) The apparatus defined in Claim 51 wherein each of the at least one multi-resolution bit distribution corresponds to one image component.

56.   (Withdrawn) The apparatus defined in Claim 55 wherein the one image component comprises a luminance plane, a chrominance plane, and a color plane.

57.   (Withdrawn) The apparatus defined in Claim 51 wherein the at least one multi-resolution bit distribution provides information of the first document image at codeblock resolution.

58.   (Withdrawn) The apparatus defined in Claim 57 wherein the at least one multi-resolution bit distribution is indicative of information on a visual document layout of the first document image.

59.   (Withdrawn) The apparatus defined in Claim 51 wherein the retrieval attributes calculation unit generates the one or more attributes of the first document image by deriving the one or more attributes by applying an algorithm to the at least one multi-resolution bit distribution.

60.   (Withdrawn) The apparatus defined in Claim 51 wherein the retrieval attributes calculation unit generates the one or more attributes by generating at least one resolution-level segmentation map from one of the at least one multi-resolution bit distribution.

61.   (Withdrawn) The apparatus defined in Claim 60 wherein the retrieval attributes calculation unit generates at least one resolution-level segmentation map by generating one resolution-level segmentation map for planes of one selected from a group consisting of color planes and a group of luminance and chrominance planes.

62.   (Withdrawn) The apparatus defined in Claim 60 wherein the one or more attributes comprise one or more selected from a group consisting of one or more content percentages relating to an amount of one or more of text, image, color and

background in the first document image, one or more statistics of connected components in the at least one segmentation map, spatial relationships between components in one or both of the at least one segmentation map and one or more bit distribution images, one or more histograms for code block partition, one or more resolution-level histograms, column layout, and one or more of projection histograms of text blocks, background blocks, color blocks, and resolution values in the at least one resolution-level segmentation map.

63.   (Withdrawn) The apparatus defined in Claim 60 wherein the retrieval attributes calculation unit computes high-resolution information from the at least one resolution-level segmentation classifies the information into text data and non-text data classes; and

applies a projection method to the information classified as text data to determine a number of columns.

64.   (Withdrawn) The apparatus defined in Claim 63 wherein the retrieval attributes calculation unit computes the high-resolution information from the at least one resolution-level segmentation map comprises masking the at least one multi-resolution bit distribution at a first resolution level with the resolution-level segmentation map at a second resolution level.